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Immediate Water Pollution Control Needs Lower Mississippi River Basin, Missouri, Kentucky, Tennessee, Arkansas, Mississippi and Louisiana

Federal Water Pollution Control Administration, Dallas, TX

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PB 266 619

IMMEDIATE WATER POLLUTION CONTROL NEEDS

LOWER MISSISSIPPI RIVER BASIN

MISSOURI, KENTUCKY, TENNESSEE, ARKANSAS,

MISSISSIPPI AND LOUISIANA

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTH CENTRAL REGION
DALLAS, TEXAS 75202

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16. ABSTRACT

The purpose of the report is to focus attention on known sources of pollution in this area and to provide a priority for action to correct existing problems and to prevent future problems.

17. KEY WORDS AND DOCUMENT ANALYSIS

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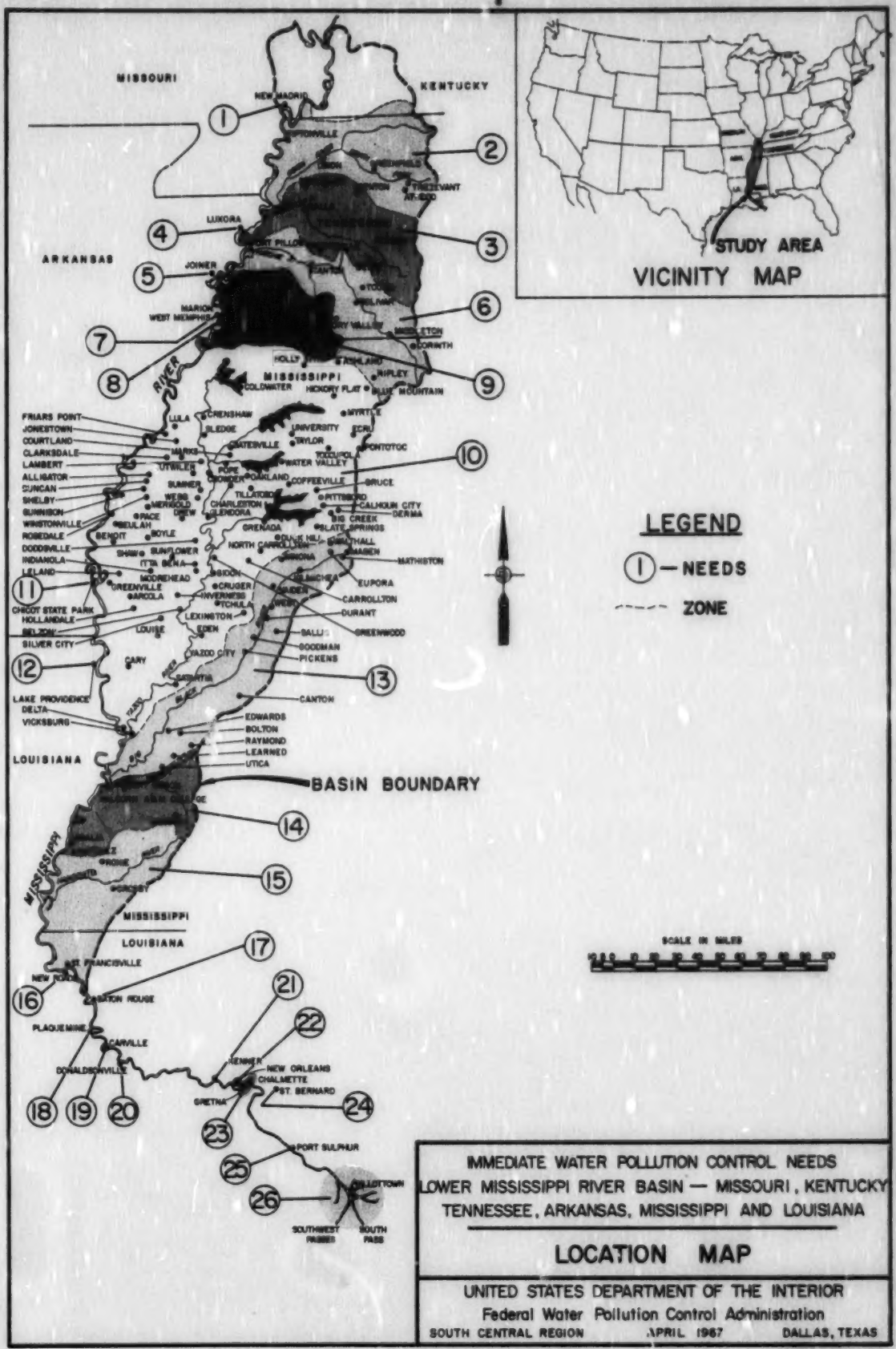
I. Introduction

The purpose of this report is to focus attention on known sources of pollution and to provide a priority for action to correct the existing water pollution problems and prevent future problems in the Lower Mississippi River Basin, (see Figure 1), an interstate stream and its tributaries. This report is based on compilations of available data of the Federal Water Pollution Control Administration, South Central Region, and the pollution control agencies of Missouri, Kentucky, Arkansas, Tennessee, Mississippi and Louisiana. No detailed water quality surveys or engineering studies were carried out for the preparation of this report.

The findings of this report are based on the best information available at this time on water quality conditions and immediate and potential pollution abatement needs. The omission of any particular town, industry, or other establishment from this report does not imply that an immediate or potential pollution abatement need may not possibly exist in that particular area. Priorities listed are based solely on an evaluation of the Lower Mississippi River Basin and not on a relative basis with other basins in the South Central Region.

Authority is given in Section 3 (a) of the Federal Water Pollution Control Act, as amended, for the preparation or development of comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries thereof and improving the sanitary conditions of surface and underground waters. This report, by describing the immediate needs for controlling water pollution in the Lower Mississippi River Basin, represents another step in the development of a comprehensive program to control water pollution in this basin.



IMMEDIATE WATER POLLUTION CONTROL NEEDS
LOWER MISSISSIPPI RIVER BASIN — MISSOURI, KENTUCKY
TENNESSEE, ARKANSAS, MISSISSIPPI AND LOUISIANA

LOCATION MAP

UNITED STATES DEPARTMENT OF THE INTERIOR
Federal Water Pollution Control Administration
SOUTH CENTRAL REGION APRIL 1967 DALLAS, TEXAS

FIGURE 1

II. Summary of Immediate Pollution Control Needs

Pollution problems in the Lower Mississippi River Basin, as indicated by high bacterial densities below sewer outfalls, oxygen depletion, oil slicks, increasing concentrations of synthetic organics, chlorides and other minerals and degradation of aesthetics, result in damages to propagation of fish and shellfish, municipal, industrial, and agricultural water supply, and recreation uses. 1/ The immediate pollution control needs are listed in the following tabulation and grouped into categories: waste treatment, other pollution control practices, institutional practices and research. Location designations refer to Figure 1. Pollution problems of the St. Francis, White, Arkansas, and Wolf Rivers are described in other Immediate Needs Reports; however, since these rivers discharge to the Mississippi River their effects have been considered in this report.

Location	Responsibility	Need	Priority
Waste Treatment			
1	City of New Madrid, Mo.	Sanitary sewers & primary & secondary treatment	B
Zone 2	Town of Atwood, Tenn.	Sanitary sewers & primary & secondary treatment	B
	Town of Greenfield, Tenn.	New primary & secondary treatment (abandon existing primary plant)	A
	Town of Obion, Tenn.	Primary & secondary treatment	A
	Town of Tiptonville, Tenn.	Primary & secondary treatment	A
	Town of Trezevant, Tenn.	Sanitary sewers & primary & secondary treatment	B
Zone 3	Town of Bemis, Tenn.	Primary & secondary treatment	A
	Town of Brownsville, Tenn.	Additional primary & secondary treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Zone 3 (Cont'd)	Town of Halls, Tenn.	Add secondary treatment	A
	City of Jackson, Tenn.	New primary & secondary treatment	A
	Town of Trenton, Tenn.	Add secondary treatment	A
4	Town of Luxora, Ark.	Primary & secondary treatment	A
5	City of Joiner, Ark.	Sanitary sewers & primary & secondary treatment	B
Zone 6	Town of Bolivar, Tenn.	Additional primary & secondary treatment	B
	City of Corinth, Miss.	Add secondary treatment & expand existing units	A
	Fort Pillow Prison at Fort Pillow, Tenn.	Replacement of secondary treatment	B
	Town of Hickory Valley, Tenn.	Sanitary sewers & primary & secondary treatment	B
	Town of Middleton, Tenn.	Sanitary sewers & primary & secondary treatment	B
	City of Ripley, Miss.	Primary & secondary treatment to replace septic tank	A
	Town of Stanton, Tenn.	Sanitary sewers & primary & secondary treatment	B
	Town of Toone, Tenn.	Sanitary sewers & primary & secondary treatment	B
	Shufibre Corp. near Covington, Tenn.	Additional waste treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
7	City of Marion, Ark.	Secondary treatment	B
8	City of West Memphis, Ark.	Additional primary & secondary treatment	B
9	City of Memphis, Tenn.	Primary & secondary treatment	B
Zone 10	Town of Alligator, Miss.	Sanitary sewers & primary & secondary treatment	B
	Village of Ashland, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Arcola, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Batesville, Miss.	Primary & secondary treatment	A
	City of Belzoni, Miss.	Primary & secondary treatment	A
	Town of Benoit, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Beulah, Miss.	Sanitary sewers & primary & secondary treatment	B
	Village of Big Creek, Miss.	Sanitary sewers & primary & secondary treatment	B
	Blue Mtn. College at Blue Mtn., Miss.	Secondary treatment	B
	Town of Boyle, Miss.	Sanitary sewers & primary & secondary treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Zone 10 (Cont'd)	Town of Bruce, Miss.	Additional secondary treatment	B
	Town of Carrollton, Miss.	Primary & secondary treatment	A
	Town of Cary, Miss.	Sanitary sewers & primary & secondary treatment	B
	City of Clarksdale, Miss.	Add secondary treatment	A
	Town of Coffeeville, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Coldwater, Miss.	Secondary treatment	B
	Village of Courtland, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Crowder, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Cruger, Miss.	Primary & secondary treatment	A
	Delta Casting Plant near Vicksburg, Miss.	Secondary treatment and tile field	B
	Town of Derma, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Doddsville, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Drew, Miss.	Primary & secondary treatment	A
	Town of Duck Hill, Miss.	New primary & secondary treatment	A

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Zone 10 (Cont'd)	Town of Duncan, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Ecru, Miss.	Sanitary sewers & primary & secondary treatment	B
	Village of Eden, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Friars Point, Miss.	Primary & secondary treatment	A
	Village of Glendora, Miss.	Sanitary sewers & primary & secondary treatment	B
	City of Greenville, Miss.	Primary & secondary treatment	A
	City of Greenwood, Miss.	Secondary treatment (under construction)	A
	Town of Gunnison, Miss.	Sanitary sewers & primary & secondary treatment	B
	Village of Hickory Flat, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Inverness, Miss.	Primary & secondary treatment	A
	Town of Jonestown, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Lambert, Miss.	Primary & secondary treatment	A
	City of Lexington, Miss.	Primary & secondary treatment	A
	Town of Louise, Miss.	Sanitary sewers & primary & secondary treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Zone 10 (Cont'd)	Town of Lula, Miss.	Primary & secondary treatment	B
	Town of Marks, Miss.	Primary & secondary treatment	A
	Town of Moorehead, Miss.	Secondary treatment	B
	Town of Myrtle, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of N. Carrollton, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Oakland, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Pace, Miss.	Sanitary sewers & primary & secondary treatment	B
	Village of Pittsboro, Miss.	Sanitary sewers & primary & secondary treatment	B
	Village of Pope, Miss.	Sanitary sewers & primary & secondary treatment	B
	City of Rosedale, Miss.	Secondary treatment	B
	Village of Satartia, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Sidon, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Silver City, Miss.	Sanitary sewers & primary & secondary treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Zone 10 (Cont'd)	City of Shelby, Miss.	New primary & secondary treatment	A
	Town of Sunflower, Miss.	Primary & secondary treatment	A
	Village of Slate Springs, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Sledge, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Sumner, Miss.	Primary & secondary treatment	A
	Village of Taylor, Miss.	Sanitary sewers & primary & secondary treatment	B
	Village of Tillatobo, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Toccupola, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Tutwiler, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of University, Miss.	Secondary treatment	B
	City of Vicksburg, Miss.	Primary & secondary treatment	A
	Town of Webb, Miss.	Primary & secondary treatment	A
	Village of Winstonville, Miss.	Sanitary sewers & primary & secondary treatment	B
	City of Yazoo, Miss.	Primary & secondary treatment	A

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
11	Lake Chicot St. Park near Chicot, Ark.	Sanitary sewers & primary & secondary treatment	B
12	Town of Lake Providence, La.	Primary treatment	A
Zone 13	Town of Bolton, Miss.	Replacing existing facility with secondary treatment	B
	Town of Durant, Miss.	Primary & secondary treatment	A
	Town of Edwards, Miss.	Replacement of secondary treatment	B
	Town of Goodman, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Kilmichael, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Learned, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Maben, Miss.	Primary & secondary treatment	B
	Town of Mathiston, Miss.	Primary & secondary treatment	A
	Town of Sallis, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of Vaiden, Miss.	Sanitary sewers & primary & secondary treatment	B
	Village of Walthall, Miss.	Sanitary sewers & primary & secondary treatment	B
	Town of West, Miss.	Sanitary sewers & primary & secondary treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
Zone 13 (Cont'd)	City of Winona, Miss.	Primary & secondary treatment	A
Zone 14	A&M College at Alcorn, Miss.	Secondary treatment	B
	City of Natchez, Miss.	Primary & secondary treatment	A
	Town of Port Gibson, Miss.	Primary & secondary treatment	A
	Town of Vidalia, La.	Secondary treatment	B
	Town of Wesson, Miss.	Primary & secondary treatment	A
Zone 15	Town of Crosby, Miss.	Sanitary sewers & primary & secondary treatment	B
	Village of Roxie, Miss.	Primary & secondary treatment	A
	Town of St Francisville, La.	Secondary treatment	B
16	Town of New Roads, La.	Primary treatment	A
17	City of Baton Rouge, La.	Secondary treatment	B
18	Town of Plaquemine, La.	Secondary treatment	B
19	U.S.P.H.S. Hospital at Carville, La.	Secondary treatment	A
20	City of Donaldsonville, La.	Secondary treatment	B

Location	Responsibility	Need	Priority
Waste Treatment (Continued)			
21	City of Kenner, La. Plant #2	Secondary treatment	B
22	City of New Orleans, La.	Primary & secondary treatment	A
23	City of Chalmette, La.	Secondary treatment	B
	City of Gretna, La.	Secondary treatment	B
24	Town of Saint Bernard, La.	Secondary treatment	B
25	Potash Plant at Port Sulphur, La.	Secondary treatment	B
Zone 26	Delta Nat'l Wildlife Refuge at Pilottown, La.	Chlorination treatment	B
	U. S. Coast Guard, Head of Passes WJLS & South Pass	Secondary treatment	B
	U.S. Coast Guard, Southwest Passes Entrance Light Station	Secondary treatment	B
Basinwide	FWPCA & Other Gov't Agencies	Provide waste treatment facilities for all government owned vessels. Lead in development and use of waste disposal collecting devices for vessel wastes	A
Other Pollution Control Practices			
Basinwide	FWPCA, Coast Guard and States of Entire Basin	An early warning and monitoring plan for hazardous cargo should be developed and implemented for the entire basin	A

Due to circumstances beyond our control page 12 of this report is missing. Although all efforts to obtain the missing page have been unsuccessful, we are making the remainder of this report available to the public.

Location	Responsibility	Need	Priority
Institutional Practices (Continued)			
Basinwide	FWPCA and USDA	Establish an educational program for the prevention of stream pollution resulting from the use of pesticides and herbicides.	B
Research			
Basinwide	FWPCA and State of Louisiana	Establish a program to identify the causes of undesirable tastes in fish and potable water supplies	A
New Orleans, Louisiana	FWPCA and City of New Orleans	Establish a project to demonstrate a method of treating storm water before discharge to protect the quality of Lake Ponchartrain.	A
Basinwide	Pesticide producers and U. S. Dept. of Agriculture	Develop new pesticides which are effective, but do not persist in the aquatic environment or damage aquatic biota.	A
Basinwide	U.S.D.A.	Conduct research to provide better methods of controlling pesticide runoff from agricultural lands.	A
Basinwide	FWPCA	Hydrological and model simulation studies to determine necessary procedures to prevent salt water intrusion in the Mississippi main stem	B

III. Immediate Control Needs

Various measures are needed to control existing and potential water pollution of the Lower Mississippi River and its tributaries. These measures are needed to abate oxygen depletion and septic conditions, reduce bacterial densities, oil slicks, reduce concentrations of synthetic organics and inorganics, and control salt water intrusion for the protection of water uses within the basin, which include municipal and industrial water supply, propagation of fish and wildlife, irrigation and recreation.

The actions recommended here, though not all encompassing, are prerequisite to good water quality planning and should be included in local, State, and Federal programming for water pollution control. Background for these immediate needs is summarized in Chapter VI.

Waste Treatment

Waste treatment facilities for the City of New Orleans, Louisiana, are needed immediately to serve a design population of 840,000.

In addition to the major water pollution control needs at New Orleans, Louisiana, 126 locations need new or expanded facilities to provide adequate sewage treatment for wastes produced before disposal in streams of the Lower Mississippi River Basin. Of this total, 35 plants to provide treatment for untreated releases have a high priority. Secondary treatment or various additions and alterations are needed at locations now providing inadequate treatment and having a high priority to protect water quality. 2/

Modifications are needed at 27 plants now providing various degrees of treatment to adequately protect receiving waters. In addition, sanitary sewers, primary and secondary treatment will be needed within the next five years by 54 municipalities. Improvements are needed at four Federal activities now discharging wastes to waters of the Lower Mississippi River Basin. The list of needs is not considered all inclusive and does not reflect projected needs due to future obsolescence or to expanded or changed water uses.

The Federal government should provide waste holding or treatment facilities for all its vessels. In this regard the Federal activities operating vessels in the Lower Mississippi River Basin should provide leadership and give direction to the development of waste holding and adequate treatment devices for vessels, including shore-based installations for receiving and adequately treating vessel wastes prior to disposal.

Other Pollutional Control Practices

The State of Louisiana has in effect on the Mississippi River an early warning system which provides a notice to downstream water users of any spills of toxic or noxious materials. A system such as this should be planned and placed into effect for the entire length of the Lower Mississippi River. A monitoring system, including the issuance of permits for moving hazardous cargo on interstate waters, should be developed by the Federal government. Tugs towing hazardous cargos should be required to monitor a predetermined radio frequency and give position reports along the river. A plan should also be developed to report any accidental spill from a land vehicle crossing the Mississippi River by bridge or ferry.

An aggressive enforcement of the Federal laws coupled with the initiation of regular and frequent surveillance of watercraft to prevent accidental oil spills while loading or unloading vessels and while vessels are enroute, and oil discharges from ballast and bilge water need to be initiated by FWPCA in cooperation and conjunction with other Federal and State agencies. The FWPCA should take the lead in such activities and in the coordination of the other activities of other agencies.

Institutional Practices

An effective comprehensive water pollution control and water quality management program is needed in the basin. Federal Water Pollution Control Administration should provide advice to the appropriate agencies and coordinate water pollution control aspects for all plans for impoundments, highways, levees, flood control and soil conservation works which affect water quality.

To strengthen the states' position on prevention, control and abatement of stream pollution, water quality standards are needed on intrastate streams. State participation is needed in the waste treatment plant construction grants program to accelerate the construction of needed improvements. Increased surveillance and operation inspection of sewage and industrial waste treatment plants are needed to locate and identify existing or potentially serious pollution problems. For more rigid control over industrial pollution and aid in solving complex stream quality problems, a complete and up-to-date inventory is needed of industrial waste discharges to basin streams, listing quantity and quality of effluent and other pertinent data.

Legislation with enforcement provisions is needed in the states of Missouri, Kentucky, Tennessee, Arkansas, Mississippi and Louisiana to establish control on use of pesticides and herbicides. There is also a need for educational programs by the Department of Agriculture

and the Federal Water Pollution Control Administration to instruct prospective commercial applicators on the proper use of insecticides.

Research

Research should be conducted by the Federal Water Pollution Control Administration and the State of Louisiana in conjunction with the industrial waste survey to identify the chemicals which are causing undesirable tastes in fish and potable water supplies.

Storm water discharged into Lake Pontchartrain should be treated to lower the bacteria count before discharge. A $1,034,250.00 Federal Demonstration Grant has been awarded the City of New Orleans for the chlorination and hypochlorination of pollution storm water pumpage. The total cost of $1,429,000 for the project will demonstrate the effectiveness, efficiency, and economics of using open drainage canals as treatment facilities; the effectiveness of chlorine and hypochlorite disinfection on intermittent high flow discharges; the optimization of various feeding rates, multiple points of application; and control times.

There is a need to develop and promote the use of new pesticides which are toxic to specific organisms but have little or no effect on aquatic life and are short-lived in the aquatic environment. The use of these agricultural materials, following their development, should be promoted by U. S. Department of Agriculture. There is a further need for research on controlling pesticide runoff from agricultural lands.

During periods of low flow, salt water intrusion from the Gulf of Mexico has threatened the municipal water supply of New Orleans and neighboring communities. A hydrological model simulation study by the Federal Water Pollution Control Administration to determine a means for prevention of this condition is needed.

IV. Costs

The estimated cost of pollution control measures listed in the summary table is shown in the following tabulation:

Item	Estimated Cost
Municipal Waste Treatment Facilities	
New treatment facilities primary and secondary treatment	$69,408,000
Expansion and replacement of treatment facilities	1,895,000
State Recreation Area	
New treatment facilities	50,000
Federal Installations	
Addition of new treatment facilities	64,000
Research	
New Orleans demonstration grant treatment of storm water	1,429,000
Research on chemicals causing tastes in fish and water supplies	undetermined
Research on new pesticides and herbicides	undetermined
TOTAL	$72,846,000

V. Recent Progress in Pollution Control

Federal Aid Construction Grants Program

Many domestic waste treatment facilities have been completed since 1958 under the Federal Aid Construction Grants Program. Twelve projects are presently under construction and eight grants have been awarded. 3/

State Agencies

The Stream Pollution Control Division, Tennessee Department of Public Health, has been active for twenty years in the pollution abatement program. They estimate that organic wastes discharged from cities and industries in the Hatchie River Basin have increased from 23,790 to 36,695 population equivalents, but in spite of this 54 percent increase, 48 percent less organic waste is now being discharged to the Hatchie River, the result of improved treatment facilities. 5/

The pollution control agencies of Louisiana, Missouri, Kentucky, Arkansas, and Mississippi have made significant strides in recent years in controlling water pollution through surveillance, stream monitoring networks, construction of treatment facilities, training programs, and inspection of treatment plant operation.

Federal Agencies

The Federal Water Pollution Control Administration through the Lower Mississippi River Technical Assistance Program has maintained an endrin monitoring program on the Mississippi River from Hickman, Kentucky to the Gulf of Mexico. There have been no major fish kills attributable to endrin since the institution of this program. The Federal Water Pollution Control Administration is now developing a comprehensive program for the Lower Mississippi River Basin.

VI. Background

Pertinent Basin Characteristics

The Mississippi River rises in Minnesota and flows southward 2,350 miles to the Gulf of Mexico. The Lower Mississippi River Basin begins at the mouth of the Ohio River (Cairo, Illinois) and encompasses parts of the States of Missouri, Kentucky, Arkansas, Tennessee, Mississippi, and Louisiana, draining over 40 percent of the United States. The alluvial valley of the Lower Mississippi River is a broad, gently sloping lowland which begins below Cape Girardeau, Missouri, and extends to the Gulf of Mexico. This lowland extends more than 600 miles and varies in width from 30 to 125 miles, and is bordered by abrupt escarpments. Tributary flows join the main river at various locations and the lowland extends up these tributaries many miles beyond the broad flat basins in the vicinity of the junctions. 6/

The main stem of the Lower Mississippi River is leveed to near its mouth. Outside of the levees the land is comprised of woodlands and large areas of farm land. The tributaries west of the river and those in the Memphis area have been covered in other Immediate Needs Reports. The area east of the river (Figure 1) covered in this report is drained by the Hatchie, Yazoo, and Big Black Rivers.

The Hatchie River rises in Mississippi, flows north through small towns and rolling farm land and flows into the Mississippi River in Tipton County, Tennessee. The Yazoo and Big Black River Basins are primary agricultural areas and flow from north to south in Mississippi. The Yazoo River discharges to the Mississippi River near Vicksburg, Mississippi, and the Big Black in Claiborne County, Mississippi. In 1965 the Lower Mississippi River Basin produced 1,197,000 acres of cotton and 1,344,000 acres of soybeans. A total of 9,490,800 pounds of insecticides including 529,900 pounds of endrin was used to treat the crops in these two basins. 6/

Flow in the Mississippi River varies from about 150,000 cfs in the fall to about 1,200,000 cfs in late spring, illustrating the large discharges involved even during low flow periods. Historically, the tributary basins and lowlands along the main river have been subject to annual flooding when river stages exceeded bankful conditions; however, the construction of levee systems has greatly reduced the area subject to flooding. 6/

Water Quality

A review of analytical records of raw Mississippi River water from the Carrolton Water Plant, New Orleans, Louisiana, for the

period January 1940 - December 1965 indicates that no significant change occurred in the standard chemical quality of the water during that period. The only known available record, prior to 1940, is for the period May 1905 - April 1906, indicating that there was considerable deterioration in the chemical quality of the water between 1906 - 1940. A further comparison of average values for the period January 1958 - September 1965, and January 1940 - September 1965 from different sources indicates no significant change. Even with the deterioration of the chemical quality of the surface waters of the Lower Mississippi River since 1906 the overall quality is still considered good. 7/ Taste and odors are the main problems encountered in treating the water to meet U. S. Public Health Service Drinking Water standards. 4/ No suitable index is known for satisfactorily measuring these parameters. The following tabulation depicts the general good quality of the water.

	Samples	Dissolved Solids (mg/l) Max.	Min.	Mean	Chlorides (mg/l) Max.	Min.	Mean
Carrolton Water Plant at New Orleans, La. May 1905-Apr. 1906 a/		210*	130*	166*	17	4.8	9.7
Carrolton Water Plant at New Orleans, La. Jan. 1940-Dec. 1965 b/		555	159	256	120	10	29
Mississippi River at New Orleans, La. Jan. 1958-Sept. 1965 c/	390	369*	31	240*	68	11	27
Mississippi River at West Memphis, Ark. Jan. 1958-Sept. 1965 c/	350	440*	106*	243*	41	5	15

	Samples	Sulfates (mg/l) Max.	Min.	Mean	Hardness(as $CaCO_3$) (mg/l) Max.	Min.	Mean
Carrolton Water Plant at New Orleans, La. May 1905-Apr. 1906 a/		36	17	24	154	94	114
Carrolton Water Plant at New Orleans, La. Jan. 1940-Dec. 1965 b/		92	23	47	245	90	140
Mississippi River at New Orleans, La. Jan. 1958-Sept. 1965 c/	390	208	30	53	197	66	142
Mississippi River at West Memphis, Ark. Jan. 1958-Sept. 1965 c/	350	102	2	50	334	72	148

*Residue after evaporation at 180°C.

Sources:

a/Analyses of 7-day composites. Published by Louisiana Department of Public Works. 8/
b/Monthly averages of 7-day composites. Unpublished data from Carrolton Water Plant files. 7/
c/FWPCA National Water Quality Network. 1/

It is believed that undetermined chemicals in the wastes from industries along the river are causing the taste and odor problems. Oil on the surface waters is also causing problems for both domestic and industrial water users. Industry treats the process water in many cases to reduce hardness.

Present Water Quality Problems

Municipal Wastes - The two major communities in the Lower Mississippi River Basin discharging untreated sewage to the Mississippi River are New Orleans, Louisiana, and Memphis, Tennessee. The former represents a population equivalent of 550,000 and the latter 840,000. There are, in addition to these two cities, approximately 138 smaller communities discharging untreated or inadequately treated wastes to the Lower Mississippi River or to its tributaries. These wastes are producing bacterial loads in the river which constitute a health threat to the water uses. The high bacterial densities below New Orleans, Louisiana, for example, prevent the deliberate introduction of Mississippi River water into the oyster growing areas in the east delta marshes. These low-saline waters are necessary for oyster propagation and would increase oyster production if they could be used. The bacterial load in the waters constitute a continuous threat to the oyster beds near or northwest of the various outlets of the mouth of the river; however, only during periods of very high flow in the Mississippi is the threat significant. The Louisiana State Board of Health maintains a monitoring program in these and all oyster beds in the Louisiana estuaries. The sanitary wastes from the City of New Orleans also indirectly pollute the waters of Lake Pontchartrain via storm water, although the collecting systems are separate. During periods of heavy rainfall the city's storm water drains into canals which are pumped into the lake. Leakage from the sanitary sewers contaminates this storm water and results in periodic bacterial contamination of the lake. During the summers of 1965 and 1966 the public beaches along the lake were closed for swimming because of this pollution.

In the smaller tributaries untreated municipal wastes produce low D.O.'s and at times septic conditions.

Industrial Wastes - Industrial wastes are introduced into the Lower Mississippi River principally from the Upper Mississippi River drainage (see various Immediate Needs Reports covering these areas), the Memphis area industrial complex (see Wolf River, Loosahatchie River, and Nonconnah Creek Immediate Needs Report), and the petro-chemical - primary metals, industrial complex in the area from about

St. Francisville, Louisiana, to a few miles below New Orleans, Louisiana. This latter area of prime concern is comprised of over 65 major industries located along the banks of the Mississippi River, and represents one of the largest concentrations of its kind in the world. Such companies as U.S. Rubber, Humble Oil and Refining, Reynolds Metal, Kaiser Aluminum and Chemical, Dow Chemical, Shell Oil and Shell Chemical, Borden Chemical, Allied Chemical, E. I. DuPont de Nemours, National Phosphate, Union Carbide, and American Cyanamide have established a huge complex dependent on the river for a water supply, waste discharge, and an outlet via ocean-going transports to world markets. The process and cooling waters from the majority of these industries are discharged into the river. Most industries provide some form of pre-treatment, and discharge of known toxic materials is not permitted under Louisiana law. It is recognized, however, that small fractions of many complex chemicals are being discharged into the river. The degradation properties of these compounds are largely unknown, as are the possible combination of these materials in the ecosystem and the effects produced by their synergism and/or antagonisms. Chronic taste and odor problems in the finished water supplies of the downstream users and off-flavors in commercial fish are the principal problems possibly resulting from these waste releases. In addition, releases or spills such as occasionally occur during refining and transportation of petroleum and of clay residues from the alumina industries damage the aesthetic value of the waterway. The large dilution effect of the river normally prevents serious problems, but there are several recorded instances in recent years where these manmade pollutants have not been diluted beyond detection or biochemically assimilated by the river. In 1958, for example, the chemical orthonitrochlorobenze, produced by a plant in St. Louis, Missouri, was detected in the finished water of all downstream stations. In January 1960, an accidental discharge of a large quantity of phenol by a Baton Rouge manufacturer seriously damaged the taste of the potable water supplies of downstream users for several days. This incident caused much public concern over the possible health hazards of industrial wastes, and resulted in the development of an "early warning system" by the State of Louisiana for water users of the Mississippi River. 9/ This system was used successfully in the cases of another phenol spill in March 1960, an oil barge sinking in 1960, several oil spills, and a chlorine barge sinking following Hurricane Betsy in September 1965.

Probably the most publicized and potentially the most dangerous pollutant affecting the Mississippi River was the pesticide endrin.

During the fall-winter months of 1963-64, over 5 million fishes were estimated to have died from unnatural causes in the fresh waters of the Lower Mississippi River, its principal distributaries in the Atchafalaya River, and the estuaries formed by these rivers as they flow into the Gulf of Mexico. Investigations by the Federal Water Pollution Control Administration clearly established endrin as the cause of the kills. The only known endrin producer in the Lower Mississippi drainage, located in Memphis, Tennessee, subsequently made changes in its waste disposal practices which significantly lowered the amount of waste endrin reaching the Mississippi River. To date there has been no repetition of fish kills in the lower system such as those observed in 1963-64.

Vessel Pollution - A detailed account of pollution from vessels is given in the unpublished report of the South Central Region entitled "Investigation of Pollution of Navigable Waters by the Operation of Watercraft". Sanitary wastes from vessels cause damages to the streams in the basin similar to untreated municipal wastes. In addition, these vessels contribute litter, refuse, and other solid wastes which damage the aesthetic value of the waterways.

Oils and other petrochemicals are introduced by washing-down operations and from bilge and ballast water pumped into the streams. Larger quantities of these hydrocarbons result from accidental spills caused by poor operational techniques, loose hose connections, faulty equipment, collisions, and sinking of barges and ships. Whatever the source, the release of products result in damages to shellfish, fish and wildlife, potable and industrial water supply, and aesthetics.

Agricultural Pollution - The Lower Mississippi River Technical Assistance Project of Federal Water Pollution Control Administration has detected the pesticide endrin in all tributaries to the Lower Mississippi monitored in its study. In addition, this pesticide was found at all sampling stations on the Mississippi main stem and in the Mississippi estuary. This and other pesticides constitute a threat to the biota of the stream, and have frequently caused fish kills. The potential health hazard to the users of these streams has, to date, not been completely evaluated.

Agricultural activities also contribute silt from quick runoff. This material is detrimental to the stream's biota and often damages the aesthetic values of the waterway.

Salt Water Intrusion - Salt water intrusion coming up the river from the Gulf of Mexico during periods of low flow represents a source

of potential damages to the fresh water supplies of municipalities and degradation of quality of water for industrial use.

Tributaries - The Hatchie River, slow-moving, meandering, and shallow, is generally in good condition. Although the main river is not seriously damaged, several of the tributaries to the Hatchie have experienced low dissolved oxygen concentrations, high concentrations of B.O.D. producing materials and excessive quantities of coliform and fecal streptococcus bacteria. Most of the pollution problems result from municipal waste releases. One industry, the Shufiber Corporation, discharges into Town Creek approximately seven miles above its confluence with the Hatchie River. Solids, organic wastes, and color cause local problems of low D.O.'s and damage to the biota and aesthetic value of this tributary.

The Yazoo and Big Black Rivers drain principally agricultural areas. These waters are of good quality, but contain pesticides and silt carried by heavy runoff. These pesticides contribute to the pollution of the Mississippi River and result in local fish kills in the Yazoo and its tributaries. There are several pesticide and fertilizer formulators in the Yazoo drainage basin - particularly in the Greenville, Mississippi area. These industries are not considered significant pollution problems because of their lack of liquid discharges, although runoff from plant grounds following rainfall may produce local problems such as fish kills. A new paper mill under construction on the Yazoo River may be considered a potential problem, and the stream should be carefully monitored once the plant is placed in operation.

The immediate pollution control needs of the western tributaries to the Lower Mississippi River Basin, the St. Francis, the White, and Arkansas are described in a series of separate Immediate Needs Reports. Because of the large discharge of the Mississippi, these streams have relatively minor effect upon the overall quality of the Mississippi. Some pesticides are known to enter via these waterways as well as large quantities of minerals such as chlorides and sulfates (see Arkansas River Report).

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